

111. DUMETIA ALBOGULARIS, Blyth, J. A. S. xvi. 453.

Confined to the vicinity of Colombo and not uncommon; it is generally found in small flocks about the cinnamon and other low bushes, creeping about in search of insects.

112. CHRYSOMMA SINENSE, Lath.

This bird, or a pale variety, is not unfrequent near Caltura and in the Pasdoom Corle. I also observed a few specimens in the Anarajahpoora Wanny.

It hunts in small flocks about low bushes.

[To be continued.]

XXVII.—*Remarks on the Lias at Fretherne near Newnham, and Purton near Sharpness; with an Account of some new Foraminifera discovered there; and on certain Pleistocene Deposits in the Vale of Gloucester.* By the Rev. P. B. BRODIE, M.A., F.G.S.*

I AM afraid that the few observations I have to offer on the strata and fossils at Fretherne Cliff will present little novelty or importance; still there are a few points of interest to which I wish to draw the attention of our Members, and which seem to deserve a short notice. The Lias here rises in the shape of a low cliff at the end of a round hill between Saul and Arlingham. You are aware that the Severn in its course below Longney makes a great curve, so that the low lands in this district are bounded on three sides by the river, but the generally flat aspect of the scenery is relieved by the picturesque and bold outlines of the Oolitic hills on the east and south-east, and the Palæozoic system of May Hill and the Forest of Dean on the west and north-west. There are several cliffs on the banks of the Severn where the Lias is exposed between Gloucester and Aust Passage. Westbury is, I believe, the first of these below Gloucester, which I have already described (Fossil Insects, p. 58), but most of them exhibit the lowest beds of the Lias resting on the Red Marl, and contain a peculiar and on the whole distinct assemblage of organic remains. To this Fretherne and Purton form an exception, as the small sections exposed there consist of the lower Lias overlying the "Ostrea bed," equivalent to certain other portions of the series in the Vale of Gloucester, as at Hatherly, the Leigh, Piffs Elm, Hardwicke, &c. The upper part of the former cliff is composed of several layers of grayish white and blue lime-

* Read to the Cotteswold Naturalists' Club (Meeting at Sharpness), May 3, 1853.

stone, often nodular, divided by clay; and contains numerous fossils, viz. the characteristic *Gryphæa incurva*, *Lima gigantea*, *Gerwillia*, *Avicula*, *Pecten*, *Nautilus*, *Ammonites*, spines and plates of Echinoderms, and a few other shells. The lower bands present the usual alternations of blue limestone and shales, which are often loaded with broken joints of *Pentacrinites*, amongst which a few heads of the rarer *Pentacrinites tuberculatus* (Miller) have been met with. This cliff, however, is particularly interesting, from the occurrence of a new and fine species of the Brachiopod*, *Orbicula Townshendi* (named after the discoverer), and one of the Foraminifera which I lately found, and which Mr. Rupert Jones believes will prove to be a true *Nummulite*†. They occur in a particular part of the cliff near the centre, and seem to be confined to one or two bands of limestone, the weathered surfaces of which occasionally are covered with them, though, from the highly crystalline state in which these minute fossils are preserved, it is extremely difficult to make out their internal structure. This is the first occurrence of this genus in England in any stratum older than the Eocene (Tertiary) group, and was hitherto supposed to be confined to the Tertiary series. Ehrenberg proved long ago that many of these minute organisms among the Foraminifera (which form so important a part in the composition of many rocks), from the Chalk upwards, had continued to exist even to the present day, while the contemporary forms of a higher order had become extinct, and we may therefore feel less surprise at the presence of a true *Nummulite* even so low down in the secondary series as the Lias, although we have no trace of the same genus again until a comparatively recent epoch, a wide interval of time having elapsed between its supposed first creation and its reappearance in profusion in the Tertiary series. So abundant are some of these fossils in some places abroad, that vast masses of tertiary limestone are entirely composed of them, and in the Lias at Fretherne they are generally grouped together in masses.

M. Bouvigny has lately described and figured a *Nummulite*‡ from certain Jurassic strata on the continent, namely the lower marls belonging to the *calcaire à Astartes*, which occurs between the Kimmeridge Clay and the Coral Rag. I had previously

* Mr. C. Moore has lately found several new species of *Brachiopoda* in the upper Lias in Somersetshire, and one very curious shell which he thinks may belong to a new genus, having two bosses at the side. Deslongchamps has also detected several new forms belonging to this order in the upper Lias of Normandy, amongst which is a *Leptæna* of large size; all those previously discovered by Mr. Moore near Ilminster being extremely minute. See Mr. Davidson's Monograph: Palæontographical Society.

† See Mr. Jones's Note, *infra*.

‡ *Nummulina Humbertina*: see Géol. statistique, minér. et paléont. de la Meuse; Atlas, p. 47. pl. 31. f. 32-35.

observed similar forms in the Lias near Down Hatherley, but was ignorant of their true characters, for which palæontologists are indebted to the investigations of the able Assistant Secretary of the Geological Society, Mr. T. R. Jones, who has already described new and interesting species of Foraminifera from various deposits. My friend Mr. C. Moore of Ilminster, a zealous and able collector and a good naturalist, informs me that although he has detected *fifty* new species of Foraminifera in the upper Lias and Marlstone of Somersetshire, he has never yet observed a *Nummulite*. The section at Purton is very small, but fossils are most abundant; it appears to be a little higher in the series than Fretherne Cliff, and is composed of clay and shale, in which are imbedded rounded blocks and nodules of blue limestone. *Gryphæa Macullochii* is very abundant, with *Pleurotomaria Anglica*, *Ammonites Bucklandi* (a fine specimen of which was discovered by Lord Ducie), a few of the *Nummulites* above referred to, and two other new and interesting species of Foraminifera. Some slabs of limestone are covered with many species of minute Univalves. It is at this spot that the Lias is succeeded by the Upper Ludlow rocks, which crop out on the banks of the Severn a little further to the west. I confess I have a great affection for the muddy Lias, as I am indebted to it for a rich store of insect remains. When I first came into this district, now twelve years ago, I carefully examined some of the beds of the lower Lias, belonging to the *middle* part of the formation in the neighbourhood of Gloucester, without success, and I was struck with the paucity of organic remains (which certainly are not numerous), although I have since then obtained a few rare and interesting fossils in them, especially elytra of Coleoptera, about three species of Corals, and Foraminifera having the appearance of *Nummulites*. After a time I visited Wainlode Cliff, where the basement beds of the Lias are exposed in a fine section resting on the Red Marl. There for the first time I discovered several wings and small wing-covers of Beetles in fallen fragments of limestone, which led me to search more closely, and the result has been a fine collection of wings, elytra, and a few entire insects from this division of the Lias, not only in Gloucestershire, but in Somersetshire, Worcestershire, and Warwickshire, where these insect beds are more or less extensively developed, and present many features of novelty and interest.

I subjoin a Note with which Mr. R. Jones has lately favoured me, since his renewed examination of these little fossils.

MY DEAR SIR,

The following are the characters of the minute bodies in the Fretherne limestone, as far as I have been enabled to work

them out. They are discoidal, convex on both sides equally, $\frac{1}{24}$ inch in diameter, and $\frac{1}{48}$ inch thick in the centre. The surface is very coarsely granulated, excepting a narrow outside border on each face and the edge, which parts are but slightly roughened. The granulation in some specimens follows irregular wavy lines from the centre of the disc towards the border; in others it is arranged somewhat spirally around the centre; more generally, however, it covers the central space thickly and irregularly. Between the smooth border and the granulated central part is a slight, narrow depression, which is stronger in some specimens than in others. The edge is rather obtuse.

When sections and transparent slices of these little bodies are examined, the whole body is seen to be coarsely crystalline; but by means of lenses of different powers and under a strong microscope several important indications of structure may be recognized. The horizontal sections exhibit internal spiral walls (which are not, however, in the specimens I have yet manipulated, traceable to the very centre), together with short, straight, cross septa, which latter are very visible in a weather-worn specimen from Purton. In the vertical sections are seen, on each side of the median line, the vertical tapering "columns" (originating in the local difference of structure in the shell tissue), characteristic of the Nummulite group, and traces of the central horizontal row of chambers. A line of fracture traverses this series of chambers, and sometimes brownish patches stain the calc-spar along this line; but the shape of these chambers is not satisfactorily shown.

I have not yet been able to recognize the apertures of connexion between the chambers nor the aperture of the last outer chamber.

The horizontal median line of chambers, spirally arranged, the vertical "columns," and the superficial granulations (which are continuous with the internal "columns") are characteristic of the true Nummulite; but unfortunately we do not know whether the position of the apertures of the cells in this little fossil corresponds with that in the genus just referred to. Provisionally, however, it may be regarded as a Nummulite; and, should you see no objection, it may be termed *Nummulites? liassicus*.

This form essentially differs from M. Bouvigny's *Nummulina Humbertina*, especially in external character and in size.

The three *Stichostegian* Foraminifers from Purton are *Dentalina*, belonging to two species. In shape one of them is something like *D. pauperata* (D'Orbigny), and the other approaches *D. Lorneiana* (D'Orbigny). To describe and name these fossils without figures would not be advisable.

I may here add, that some years since I obtained from a specimen of Lias clay from Gloucestershire some minute fossils which may be enumerated with the above, viz. a *Cristellaria* and a *Vaginulina*, which were associated with the *Spirillina infima* and a few *Cytheres*.

I am, dear Sir, yours very truly,

T. RUPERT JONES.

The Rev. P. B. Brodie, A.M., F.G.S. &c.

Sept. 21, 1853.

I must now draw your attention to certain gravel beds round Gloucester, which have not been sufficiently or accurately examined, and which I hope some of our Members will shortly undertake to do. They are evidently of different age; one of the most recent appears to be the alluvial deposits on the banks of the Severn, of which the following section in descending order affords an example, and was given me by Mr. Edwards, one of the engineers of the Gloucester and Chepstow Railway.

	ft	in.
Soil	1	0
Sand and red clay	10	8
Light blue clay	13	9
Peat	2	0
Red sandy clay	4	0
Brown sand	1	10
Rough gravel	7	8
Sand and gravel	2	0
Fine gravel	5	10
Hard blue marl	2	3
Total.....	51	0

The above section was taken close to the Severn at Westgate (Over) Bridge. No shells are mentioned, but the thickness of the deposit is worthy of notice. The gravel round Gloucester is mainly composed of rolled fragments of Oolite and debris of Lias, and was evidently derived from the Inferior Oolite and Lias adjacent. Some pretty Oolitic Corals may be found in it, and occasionally bones and teeth of Elephant, Horse and Deer, but these are very scarce. During the excavations for the Great Western Railway at Stroud, many fine remains of Elephant, Rhinoceros, Horse, Deer, and Ox were procured from the gravel, and several of these are now in the collection of our friend and colleague Professor Buckman. The summit of Wainlode Hill is capped by a bed of pebbles called the Northern Drift, and is chiefly made up of rolled and rounded pebbles of ancient rocks

and some flints, which have travelled from the north and north-east.

Another and very interesting deposit of gravel occurs in the neighbourhood of Westbury, which clearly owes its origin to the destruction of the Old Red Sandstone in the forest, and of the Silurian rocks of Huntley, May Hill, and Longhope adjoining. Among other things it contains many beautiful Corals from the Wenlock limestone. I had hoped to have been able to have investigated the Pleistocene formation generally in Gloucestershire, but unfortunately I have not had time to accomplish it, and I must therefore leave the task to abler and better hands. Of late these more modern accumulations have deservedly attracted the attention of geologists, and many interesting facts have been brought to light respecting them, and it is most desirable that they should be carefully examined and described in different localities.

As I am so shortly about to leave this neighbourhood, to my great regret, I may be excused, perhaps, in conclusion, for paying a parting tribute of regard to the geology of the district, to which I owe many days of health and happiness, and I can only say that I know of no other which presents so rich and important a field of research, or one wherein a diligent and active lover of science may reap a more productive or abundant harvest.

Within a circuit of twenty miles, nearly every formation, from the commencement of the lower Oolite down to the lower Silurian system, may be studied with comparative ease, and a good suite of fossils from each stratum may be collected. This, as many of you are well aware, comprises a very extensive series of rocks of vast extent and thickness, of great value in an economical point of view, and containing a varied and widely different fauna, by which we obtain a knowledge of the earth's history in past times, from one of the earliest ages up to a much more recent period.

The sorrow felt on leaving a neighbourhood so instructive in natural phenomena is increased by the loss of these pleasant meetings, and the parting with many scientific friends, whose companionship has added a charm and a zest to the studies of the closet and the more active labours of the field, and must ever afford a great encouragement in the pursuit of those noble ends and grand discoveries for which geology is so pre-eminently distinguished.